

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

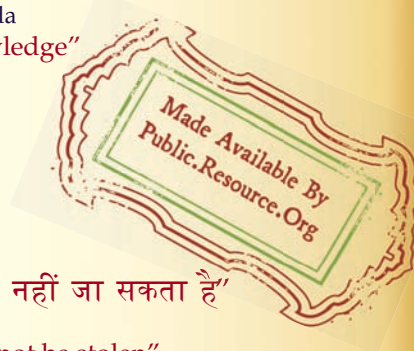
IS 8140 (1976): Guide for Selection of Panel for Sensory Evaluation of Foods and Beverages [FAD 14: Drinks and Carbonated Beverages]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

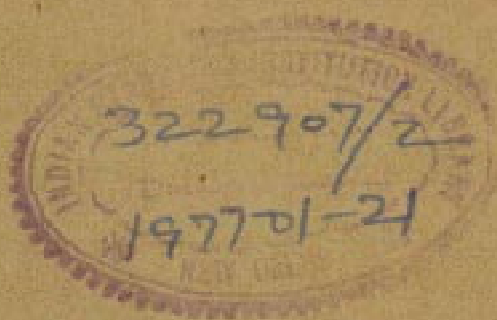
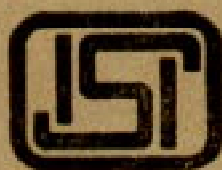
BLANK PAGE



IS : 8140 - 1976
(Reaffirmed - 2012)

Indian Standard
GUIDE FOR SELECTION OF PANEL FOR
SENSORY EVALUATION OF FOODS
AND BEVERAGES

UDC 663/664 : 543.92.007.62



© Copyright 1976

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Rs 7-00

November 1976

Indian Standard

GUIDE FOR SELECTION OF PANEL FOR SENSORY EVALUATION OF FOODS AND BEVERAGES

Sensory Evaluation Sectional Committee, AFDC 38

Chairman

SHRI M. R. SRINIVASAN

Representing

National Dairy Research Institute (ICAR), Karnal

Members

DR K. T. ACHAYA

Protein Foods and Nutrition Development Association of India, Bombay

AGRICULTURAL MARKETING
ADVISER TO THE GOVERNMENT
OF INDIA

Directorate of Marketing & Inspection (Ministry of
Agriculture & Irrigation), Faridabad

SHRI T. V. MATHEW (*Alternate*)
SHRI D. S. CHADHA

Central Committee for Food Standards (DGHS),
New Delhi

DR J. D. CONTRACTOR

The Coca-Cola Export Corporation, New Delhi

SHRI P. C. VIN (*Alternate*)

KUMARI I. F. COOPER

Naarden (India) Limited, Bombay

SHRI S. B. SULE (*Alternate*)

DR G. I. D'SOUZA

Coffee Board, Bangalore

SHRI A. V. R. MENON (*Alternate*)

SHRI V. S. GOVINDARAJAN

Central Food Technological Research Institute
(CSIR), Mysore

DR K. G. RAGHUVeer (*Alternate*)

DR M. K. K. IYENGAR

Food Specialities Limited, Moga

DR B. K. JHA

McDowell & Co Ltd, Shertallay

DR GURBHAGWANT SINGH KALHON

The Punjab Dairy Development Corporation
Limited, Chandigarh

SHRI B. M. L. GARG (*Alternate*)

SHRI A. MADHAVA RAO

Bush Boake Allen (India) Limited, Madras

SHRI K. S. SUBRAMANIAM (*Alternate*)

SHRI T. K. D. MENON

Tea Board, Calcutta

DR M. K. NAGARAJAN

Hindustan Lever Limited, Bombay

SHRI K. S. JANARDHANAN (*Alternate*)

DR A. G. NAIK-KURADE

Suman Food Consultants, New Delhi

SHRI S. N. PANDEY

All India Distillers' Association, New Delhi

SHRI B. L. KHANNA (*Alternate*)

SHRI M. V. RAMA RAO

Defence Food Research Laboratory, Mysore

SHRI H. UMESH RAO (*Alternate*)

(Continued on page 2)

© Copyright 1976

INDIAN STANDARDS INSTITUTION

This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(Continued from page 1)

Members

BRIG D. S. RAO

Representing

Technical Standardization Committee (Foodstuffs)
(Ministry of Agriculture & Irrigation), New
Delhi

SHRI J. K. JAGTIANI (*Alternate*)

SHRI C. K. RAMNATH

COL K. SEETARAM

Brooke Bond India Limited, Bangalore
Quartermaster General's Branch, Army Head-
quarters, New Delhi

LT-COL G. L. LUTHRA (*Alternate*)

SHRI N. D. SUBBA RAO

SHRI T. PURNANANDAM,

Deputy Director (Agri & Food)

United Breweries, Bangalore

Director General, ISI (*Ex-officio Member*)

Secretary

SHRI SOHRAB

Deputy Director (Agri & Food), ISI

Basic Standards for Sensory Evaluation Subcommittee, AFDC 38 : 1

Convener

SHRI V. S. GOVINDARAJAN

Central Food Technological Research Institute
(CSIR), Mysore

Members

AGRICULTURAL MARKETING
ADVISER TO THE GOVERNMENT
OF INDIA

SHRI T. V. MATHEW (*Alternate*)

DR B. M. L. GARG

Directorate of Marketing & Inspection (Ministry of
Agriculture & Irrigation), Faridabad

The Punjab Dairy Development Corporation Limited,
Chandigarh

DR B. K. JHA

DR G. SADASIVAN

McDowell & Co Ltd, Shertallay

Indian Agricultural Research Institute (ICAR),
New Delhi

SHRI M. R. SRINIVASAN

DR S. K. GUPTA (*Alternate*)

DR P. J. THOMAS

National Dairy Research Institute (ICAR), Karnal

Central Institute of Fisheries Technology (ICAR),
Ernakulam

Indian Standard

GUIDE FOR SELECTION OF PANEL FOR SENSORY EVALUATION OF FOODS AND BEVERAGES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 7 July 1976, after the draft finalized by the Sensory Evaluation Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Sensory evaluation by designed experiments under proper environment serves as an important analytical tool and is a nearer approximation to the perceived sensory qualities than the objective methods. The aim of the quality evaluation being acceptability by discriminative and communicative and untrained panel, the experts who have highly product specific skills are not appropriate for the general evaluation. Panelists of average sensitivity but trained to evaluate products for component sensory attributes in the complex situations of total food in an analytical way are of practical use in the laboratory, research and development situations. The results so obtained are further correlated with acceptability test using untrained panel.

0.3 Due to many sources of variations, sensory evaluation of foods and beverages requires special controls. Therefore, to derive reliable and valid results it is necessary to follow defined methodology to select panelists for use in the analytical and developmental work.

0.3.1 Selection from amongst the available panelists should be based on their interest in the evaluation, significant capacity to comprehend tests methods [*see* IS : 6273 (Part II)-1971*] to distinguish quality variations, concentration differences and inter-actions of tastes, odours, textures and feeling factors of various foods.

0.3.2 Panels with different degree of training are required for different types of sensory analysis. The degree of training required depends on a number of considerations, such as degree of differences to be detected, number of panelists required for the tests, time and value of the analysis to the product type and available finance. Training is also necessary for descriptive and profile panels using special procedures for specific products and situations.

*Guide for sensory evaluation of foods: Part II Methods and evaluation cards.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes sensory tests for screening, selection and training of panelists arranged in increasing order of complexity of tasks and requiring increasingly higher level of training.

1.2 Number of tests and test substances to be used in a particular selection and training requirement may be chosen appropriate to the nature and degree of differences significant to the product.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 5126 (Part I) 1969†, IS : 5126 (Part II)-1969‡ and IS : 6273 (Part III)-1975§ shall apply.

3. SCREENING OF PANELISTS

3.1 Information on name; address; age; sex; income group; education; state of origin; normal food and beverage use; food and beverage preferences and dislikes; health; food allergy, if any; interest in evaluation work and availability of the prospective personnel; should be first collected through suitably designed questionnaire.

3.2 Those showing interest and willingness to learn should be given a second questionnaire to determine their psychological status, to eliminate highly introvert or extrovert persons as their judgements tend towards extreme ends of the quality scale.

4. SELECTION OF PANELISTS

4.1 Test for Flavour Perception

4.1.1 The testing should be done in a set up conducive to independent judgement as given in IS : 6273 (Part I)-1971||.

*Rules for rounding off numerical values (*revised*).

†Glossary of general terms for sensory evaluation of foods: Part I Methodology.

‡Glossary of general terms for sensory evaluation of foods: Part II Quality characteristics.

§Guide for sensory evaluation of foods: Part III Statistical analysis of data.

||Guide for sensory evaluation of foods: Part I Optimum requirements.

4.1.2 Water or any diluent used for dilutions should not impart any taste or odour. The chemicals used should be of food grade quality.

4.1.3 Evaluation cards similar to those given in IS : 6273(Part II)-1971* should be used where specific methods like paired comparison and ranking are used.

4.2 Perception of Basic Tastes

4.2.1 Aim — Aim is to test the ability to identify basic tastes.

4.2.2 Procedure — Present several beakers containing 5 to 10 ml of the following four test solutions; 1 to 3 for each taste with a code number and in random order. Ask the panelists to identify the taste of each coded beaker:

<i>Basic Tastes</i>	<i>Taste Substances</i>	<i>Concentration (g/litre of water)</i>
Sweet	Sucrose	15
Salt	Sodium chloride	2
Sour	Citric acid, monohydrate	1
Bitter	Quinine hydrochloride	0.05

NOTE — Alternative substances at equivalent level may be used.

4.2.3 Evaluation Card — Use the evaluation card as given in Table 1.

TABLE 1 PROFORMA FOR EVALUATION CARD FOR PERCEPTION OF TASTES

Name _____ Date _____
Time _____

Taste the sample and identify the taste.

SL No.	CODE No.	TASTE IDENTIFICATION	CORRECT IDENTIFICATION
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Signature _____

*Guide for sensory evaluation of foods: Part II Methods and evaluation cards.

4.2.4 Choose those panelists who identify the tastes correctly. Those who fail in one of the tastes or their duplicates should be shown the correct results and their results discussed individually to determine if their sensitivity is poor for one of the tastes or they take a repeat test with greater attention to improve performance.

4.3 Odour Identification Test

4.3.1 The aim is to test the ability to distinguish odours.

4.3.2 Procedure — Use 20 samples of food substances or food chemicals given in Table 2A and Table 2B covering the desirable qualities and defects encountered everyday. Place the sample in tubes, stoppered preferably with glass stopper or new corks. Take powder or extracts of samples suitably diluted. Place them between two thin layers of odour-free cotton to avoid inhalation of powders or excess quantities of chemicals which may lead to irritation of mucous membranes once the tubes are opened for a test they should not be reused till they are kept stoppered for at least one hour to allow the odour to accumulate in the space above the cotton. Complete the testing of the sample within 15 minutes.

NOTE — The time limit reduces the fatigue effect and ensures undivided concentration by the panelists and quickness of the perception. The use of the associative words would indicate power of expression and communication.

4.3.3 Evaluation Card — Use some evaluation card as for perception of basic taste (*see* 4.2.2) with odour substituting for taste.

4.3.4 The panel for selection should score 80 percent correct identification. Take identification by associative word as correct identification. Discuss the correct results with those who identify correctly between 60 to 79 percent, to determine, if they may be given another qualifying test, and those who are willing and pass in the second test.

TABLE 2A SUGGESTED TEST MATERIALS — FOOD SUBSTANCES

(Clause 4.3.2)

Sl. No.	FOOD MATERIAL	QUANTITY IN g/TUBE
(1)	(2)	(3)
i)	Lemon or orange peel (cut pieces)	5
ii)	Onion, slices (cut pieces)	5
iii)	Garlic bits	2
iv)	Coffee powder roasted	2
v)	Cocoa powder	4
vi)	Vegetable oils	5
vii)	Pepper powder	2
viii)	Cardamom powder	2
ix)	Cinnamon powder	2

TABLE 2B SUGGESTED TEST MATERIALS — FOOD CHEMICALS

(Clause 4.3.2)

SL No.	CHEMICAL	CONCENTRATION		ODOUR QUALITY
		Percent	Quantity (ml or Drops)	
(1)	(2)	(3)	(4)	(5)
i)	Methylamine	0.003	2	Fishy
ii)	Butyric acid	0.001	2	Rancid
iii)	Vanillin	0.01 alcoholic solution diluted with water (1 : 100)	3	Vanilla or icecream
iv)	Benzaldehyde	0.01	3	Bitter almond
v)	Diacetyl	0.001	3	Buttery, harsh
vi)	Clove oil	—	Few drops	Cloves, spicy
vii)	Ginger oil	—	Few drops	Ginger Sweet, spicy
viii)	Guaiacol	0.005	2	Phenolic, smokey
ix)	Acetic acid	2	2	Vinegar, pungent
x)	Caramel	1	3	Caramel, sweet burnt

4.4 Taste Concentration Test

4.4.1 Aim — To test the ability to distinguish different levels of concentration.

4.4.2 Procedure — Give a set of sucrose solutions with six varying concentration in a random order and ask the candidates to arrange them in increasing order of their sweetness. The solutions used should have the sucrose concentration of 5, 6, 7.5, 10, 12.5 and 15 percent.

4.4.3 Use evaluation card as given in Table 4 of IS:6273 (Part II)-1971*. Specify the quality attributes of sweetness.

4.4.4 The qualifying candidates should be able to arrange all the samples in the series in a correct order. Those who miss the order by one place may be shown their result and given the test a second time.

4.5 Aroma Memory and Identification Test

4.5.1 Aim — To determine the capacity of the candidates to recall aroma.

4.5.2 Procedure — Take 10 coded samples of foods and of food flavours as given in Table 3. Dilute them with neutral soup or suitable food diluent. Select samples from common foods and food flavours preferably those not

*Guide for sensory evaluation of foods: Part II Methods and evaluation cards.

too familiar. Show them first to the candidates for identification in a familiarization session. Give, next day, five randomly selected test substances from each group in coded beakers to identify or describe the aroma.

TABLE 3 FOODS AND FOOD FLAVOUR SUBSTANCES

(Clause 4.5.2)

SL No.	FOOD STUFF	QUANTITY PER 100 ml OF DILUENT	CHEMICAL	ODOUR DESCRIPTION
(1)	(2)	(3)	(4)	(5)
i)	Greater cardamom	—	Amylacetate	Banana like
ii)	Celery	—	Ethyl butarate	Fruity, pungent, cooling
iii)	Long pepper	—	Menthol	Minty, sweet, cooling
iv)	Asafoetida	—	Methyl salicylate	Cooling, medicinal, ointment
v)	Yeast	—	Terpinolene	Disinfectant
vi)	Hops	—	Octanol	Rancid, detergent
vii)	Grape fruit juice	—	Methylanthralate	Grape, fruity
viii)	Passion fruit juice	—	Oct-1-en-ol	Mushroom, musty
ix)	Coffee chicory mixture	—	Hexanol	Green leaf
x)	Tea	—	Citronellol	Rosy, soapy
xi)	Mango ginger	—	Carvone	Caraway, seed spicy
xii)	Curry leaf	—	Ethyl caprate	Apple, fruity, sweetish
xiii)	Skim milk powder	—	—	—

4.5.3 Evaluation Card — Use evaluation card as given in Table 4 of IS : 6273 (Part II)-1971* substituting taste for aroma.

4.5.4 Select candidates scoring 75 percent correct identification or associations. Give a second familiarization test to those scoring 60 to 74 percent correct identification or association.

5. TRAINING FOR SENSORY PANEL WORK

5.1 A series of tests should be designed to train the selected panelists in acquiring higher acuity in taste, odour and aroma perceptions, and make judgements on intensity and quality when occurring in mixtures as in normal

*Guide for sensory evaluation of foods: Part II Methods and evaluation cards.

foods. The panelists should also familiarize themselves with different test methods used in the sensory evaluation. The panel leader should decide on the magnitude of differences and variation in taste and odour with which the panel is required to work.

5.1.1 The basis of these tests should be that those who are proficient in perceiving low levels of aroma and taste in pure solutions, exhibit reliable capability and interest in actual food situations. This should be verified by tests carried out later by introducing differences in specific food products.

5.2 Threshold Tests for Basic Taste and Aroma

5.2.1 Aim — Aim is to select a reasonably homogeneous panel.

5.2.2 Train the panelists in concepts of threshold difference and just noticeable difference (JND). Base the selection on the lowest recognition thresholds up to a prescribed number required with restriction at the maximum permissible supra-threshold concentration that may be permitted for the intended experiment. Use this test for finding approximate JND levels and in the selection of a homogenous panel eliminating panelists with too high or too low sensitivity.

NOTE — A panel for evaluation of soft beverages may tolerate higher variation in sweetness difference than the panel intended for evaluation of sweet pickles or chutneys. Similarly, a panel intended for evaluation of rancidity problem in fatty foods should have much smaller variation in rancid odour and aroma detection than the panel intended for evaluation of cheese of which rancid aroma is a normal constituent.

5.2.3 Threshold Test for Basic Taste — Give in the beginning of each series one or two blanks using diluent for preparing different dilutions from the following stock solutions:

<i>Taste</i>	<i>Reference Substances</i>	<i>Concentration (g/litre)</i>
Sweet	Sucrose	32
Salty	Sodium chloride anhydrous	6
Sour	Citric acid, monohydrate	1
Bitter	Quinine Hydrochloride, dihydrate	0.02

From the stock solutions, prepare one of the two series given in Table 4A and 4B for threshold test. Give 5 to 8 beakers depending on the quality of the taste and ask the panelists to evaluate as the threshold test given in IS : 6273 (Part II)-1971*.

NOTE — The geometric series of solutions should generally be used, and the arithmetic series of solutions may be used to obtain higher precision in gustatory acuity.

*Guide for sensory evaluation of foods: Part II Methods and evaluation cards.

TABLE 4A GEOMETRIC SERIES OF SOLUTIONS

(Clause 5.2.3)

Sl No.	VOLUME		TASTE AND CONCENTRATION				
	Stock Solution	Water	Sweet	Salty	Sour	Bitter	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ml	ml	g/l	g/l	g/l	g/l	
G 6	500	500	16	3	0.5		0.01
G 5	250	750	8	1.5	0.25		0.005
G 4	125	875	4	0.75	0.125		0.002 5
G 3	62	938	2	0.37	0.062		0.001 2
G 2	31	969	1	0.18	0.030		0.000 6
G 1	16	984	0.5	0.09	0.015		0.000 3

TABLE 4B ARITHMETIC SERIES OF SOLUTIONS

(Clause 5.2.3)

Sl No.	VOLUME		TASTE AND CONCENTRATION				
	Stock Solution	Water	Sweet	Salty	Sour	Bitter	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ml	ml	g/l	g/l	g/l	g/l	
A 9	250	750	8	1.50	0.250	0.005 0	
A 8	225	775	7.2	1.35	0.225	0.004 5	
A 7	200	800	6.4	1.20	0.200	0.004 0	
A 6	175	825	5.6	1.05	0.175	0.003 5	
A 5	150	850	4.8	0.90	0.150	0.003 0	
A 4	125	875	4.0	0.75	0.125	0.002 5	
A 3	100	900	3.2	0.60	0.100	0.002 0	
A 2	75	925	2.4	0.45	0.075	0.001 5	
A 1	50	950	1.6	0.30	0.050	0.001 0	

5.2.3.1 Threshold test for aroma—Prepare aroma test substances given in Table 5A and 5B. Give 5 to 8 beakers of the solutions in the increasing order of intensity to each panelist. Ask the panelists to evaluate as threshold test by the method given in IS : 6273 (Part II)-1971*.

5.3 Concentration Difference Test for Taste and Aroma

5.3.1 Aim—Aim is to determine the capacity of the panelists to detect small differences in taste and aroma.

*Guide for sensory evaluation of foods: Part II Methods and evaluation cards.

TABLE 5A SUGGESTED FOOD PRODUCTS FOR AROMA THRESHOLD
(Clause 5.2.3.1)

SL No.	FOOD EXTRACT	CONCENTRATION
(1)	(2)	(3)
i)	Black pepper (alcoholic extract diluted with 0.75 percent ratio)	1 : 70 000 1 : 65 000 1 : 60 000 1 : 55 000 1 : 45 000
ii)	Cardamom (alcoholic extract diluted with 1 percent sugar)	1 : 130 000 1 : 120 000 1 : 110 000 1 : 105 000 1 : 100 000 1 : 95 000
iii)	Tomato concentrate (diluted with 1 percent saline)	1 : 500 1 : 400 1 : 300 1 : 150 1 : 200 1 : 150

TABLE 5B SUGGESTED CHEMICALS FOR AROMA THRESHOLD
(Clause 5.2.3.1)

SL No.	FOOD EXTRACT	CONCENTRATION
(1)	(2)	(3)
i)	Acetate (ethyl) diluted with given percent water	1 : 45 000 1 : 40 000 1 : 37 000 1 : 30 000 1 : 20 000 1 : 10 000
ii)	Vanillin (diluted with 5 percent sugar)	1 : 200 000 1 : 100 000 1 : 50 000 1 : 40 000 1 : 30 000

5.3.2 Procedure — Use pure food chemical solutions or food products or both with definite difference in single taste stimuli in paired comparison test:

a) Pairs of taste solutions for basic comparison tests may be:

- 1) *Sweet* — Sucrose solutions, 0.8 and 1.0 (or 1.1) percent;
- 2) *Salt* — Sodium chloride solutions, 0.20 and 0.30 percent;

- 3) *Sour* — Citric acid, monohydrate solution, 0.01 and 0.014 (or 0.016) percent; and
 - 4) *Bitter* — Caffeine, 0.003 4 and 0.004 0 percent.
- b) Pairs for taste differences with food products which help panelists appreciate taste interactions between taste stimuli may be:
- 1) *Sweet* — Apple juice (0.9 percent acidity and 9 percent sugar) and the same with 2 percent extra sucrose;
 - 2) *Sour* — Tomato juice (about 0.8 percent acidity and 1 percent sodium chloride) and the same with 0.25 percent extra salt;
 - 3) *Salt* — Meat paste, regular and with 0.4 percent extra salt, mixed well; and
 - 4) *Bitter* — Beer.

5.3.2.1 Give about 5 ml of the solution or 20 g of the food to each panelist for use in paired and duo-trio tests. Use 10 pairs for each taste in these tests. Plot the cumulative number of wrong decisions against the total number of judgements for each basic test. The level of acceptance should be set at 5 percent probability. Vary the concentration if the candidates fail to qualify.

5.3.2.2 Similar tests for aroma may be set up with regular food products with additions of aroma components made at 2 or 3 established JND levels.

5.4 Training in Description of Odour or Aroma Components for Quality and Intensity

5.4.1 Testing for Identity in Related Odours and Difference in Intensity in Component Odour

5.4.1.1 Aim — To test the capacity to differentiate between related odour substances and intensity differences of same stimuli.

5.4.1.2 Procedure — Introduce the panelists to a further two test methods, namely, the triangle test and ranking test. Give 20 pairs, that is, 10 pairs of substances each in duplicate as a triangle test. Let the panelists identify and describe the odd samples in the pair. A panelist shall be deemed to have acquired sufficient training when his performance is better than 5 percent probability level in correct identification of the odd samples and better than 65 percent identity or description of the difference.

NOTE — The stimuli should be given straight if evaluation is done by odour or in use level dilutions in 3 to 5 percent sucrose solution or neutral soup for evaluation by testing.

a) For odour testing

Mace and nutmeg

Cinnamon and clove

Cardamom, and amomum
 Sesame oil fresh and slightly aged
 Mandarin and Valencia orange oil
 Groundnut and safflower oil
 Sesame oil, fresh and refined

b) *For aroma testing*

Pork and mutton
 Shrimp and fish
 Pasteurized and sterilized milk
 Fresh and cultured butter
 Butter oil and ghee
 Cardamom
 Two varieties of pepper

5.4.2 *Ranking for Intensity of Aroma and Taste*

5.4.2.1 Aim — To test the capability of the panelists for ranking for increasing intensity of aroma and taste.

5.4.2.2 Procedure — Conduct these tests in regular food situations by adding one aroma or taste stimuli at increasing levels at appropriate JND levels. In order to qualify the test, a panelist should place in the correct order 8 out of 10 samples or 5 out of 6. The misplacement of the samples should not vary by more than one place. The following series may be used:

- a) Beer (lager), with addition of 0.2, 0.4, 0.6 and 0.8 mg of diacetyl per litre of beer;
- b) Homogenized milk with addition of 0.010, 0.025, 0.050, 0.075 and 0.100 percent lactic acid;
- c) Safflower oil and the same heated at 37°C for 2, 4, 6, 8 and 12 weeks; and
- d) Fresh mango juice with 10, 20, 30, 40 and 50 percent canned mango juice.

5.4.3 *Training in Description of Odour or Aroma Components for Quality and Intensity*

5.4.3.1 Aim — To motivate the panelists to discriminate and communicate their perception descriptively to others and indicate the intensity of the stimuli, and further to train the group to choose an agreed set of descriptive terms when any stimuli is presented.

5.4.3.2 Procedure — Choose natural and synthetic components which have acquired definitive descriptions. The choice of the stimuli may vary

depending on the type of product in which an organization may be interested. However, the panel leader should be conversant with the descriptive words and their intensity with which he should convince the group. Work with simple stimuli not having too complex a profile. Some of the examples of stimuli and their descriptions are given below:

<i>Compounds</i>	<i>Intensity Scale (Max = 5)</i>
γ -Butyrolactone	Rancid 2, oily 1
<i>l</i> -Carvone	Spearmint 4, cooling 2
<i>d</i> -Carvone	Caraway 4
Citral	Lemon 3
Citronellol	Rose-like 3, detergent-like 1
Decanol	Citrus 3, detergent-like 1
Diacetyl	Oily fruity 2, pungent acid 1
Ethyl butyrate	Fruity 3, pungent 3
Eugenol	Spicy 3, fruity, sweet 2
Geraniol	Rose like 4, detergent-like 2
Guaiacol	Disinfectant-like 2, smoky 2
Hexanethiol	Sulphurous 3, putrid 2, garlic-like 2
Hexanol	Rancid 4, acid 3
<i>n</i> -Octylalcohol	Detergent-like 4, soapy 3, citrus 1
Terpinolene	Disinfectant-like 4, lime 3
Trimethylamine	Fishy 3, putrid 2

5.4.4 *Test for Discrimination and Deviation from Standard in Scoring Tests*

5.4.4.1 Aim — To evaluate the panelists for scoring where the direction and the estimate of the magnitude of difference in sensory characteristics is made.

5.4.4.2 Procedure — Employ the panel for scoring only after suitable training and testing on the product-type. Give the products one by one for evaluation. Preferably, give a selected reference of the product-type with an agreed assigned mark to anchor the understanding of the product quality by the panel.

NOTE — In order to discriminate the difference and assign an appropriate score consistently on an agreed scale, an understanding of the product, the significance of the quality attribute and level of individual sensory components in the context of the particular product, in view of the interactions of the sensory component on total quality, is necessary.

5.4.4.3 To train the panelists in this method of evaluation, prepare carefully several lots of samples which should be fairly uniform, within the

lot but should vary distinctly though not obviously in one or more qualities among the lots. Assign the scores for a particular sensory quality which has been varied and instruct the panelists on the actual score of each lot. Give the panelists for scoring the same samples, in random order with 5 samples and 4 replicates. Tabulate the scores assigned by each panelist for the replicates in each lot and analyse by the Range Method [see IS : 6273 (Part III)-1975*]. The greater the variations among the sample totals, and the smaller the variations among the replicates of the sample, the greater is the indicated ability to distinguish among the different samples. This may be shown in terms of the ratio of the range among the sample sums to the sum of range within each sample. Depending on the number of samples and replications, usually a ratio of 1.0 or more indicates a statistically significant ability to distinguish between the different samples.

5.4.4.4 Indicate the ability and consistency of the panelists in assigning an appropriate score for a sample, by the sum of deviations of scores from the assigned scores. The sum of deviations should be low (of the order of $2n$, where n is the number of samples) to indicate superior ability and to duplicate consistently assigned scores. Further train those who show ability to distinguish between samples but have poor ability to maintain scores.

5.5 Briefing — Finally, give the panelists so trained, a briefing of the different sensory evaluation methods, described in IS : 6273 (Part II)-1971† to become familiar with evaluation cards and the significance of the instruction for optimizing the test and to increase their sense of participation in the evaluation.

5.6 Training for Special Techniques, Special Requirements and Complex Products

5.6.1 Special techniques such as development of descriptive quality scales, flavour and texture profile analysis should generally be developed with reference to specific product-types and products. For these advanced techniques, panelists trained in general sensory evaluation methods and who have shown definite interest, reasonably high degree of acuity and willingness to fairly intense work in a sustained manner should be taken. These techniques are developed by the trained panel in a co-operative way, the panel leader acting only to coordinate and find the consensus.

NOTE — Details of this test should form part of the documents to be prepared, on individual foods.

5.6.2 Training in evaluation of food combinations, like ready-to-eat convenience foods also require special descriptive scales for selected attributes. This should be done by developing the procedure for specific products, using panel members with experience in the constituents of the mixed food.

*Guide for sensory evaluation of foods: Part III Statistical analysis of data.

†Guide for sensory evaluation of foods: Part II Methods and evaluation cards.

The situation is of considerable importance with these type of foods which should be kept in view in evaluating the product.

5.7 Requalifying and refresher tests, may be needed periodically when newer products become available and may be necessary as a means of motivation to acquire more confidence and improve acquity in respect of attributes and stimuli that affect perceived quality at very low concentrations.

INDIAN STANDARDS

ON

SENSORY EVALUATION

IS:

- 5126 (Part I)-1969 Glossary of general terms for evaluation of foods: Part I Methodology
- 5626 (Part II)-1969 Glossary of general terms for sensory evaluation of foods: Part II
Quality characteristics
- 6273 (Part I)-1971 Guide for sensory evaluation of foods: Part I Optimum requirements
- 6273 (Part II)-1971 Guide for sensory evaluation of foods: Part II Methods and evaluation cards
- 6273 (Part III)-1975 Guide for sensory evaluation of foods: Part III Statistical analysis of data
- 7675-1975 Method for sensory evaluation of beer
- 7768-1975 Method for sensory evaluation of milk
- 7769-1975 Method for sensory evaluation of table butter
- 7770-1975 Method for sensory evaluation of *GHEE* (clarified butter fat)
- 7997-1976 Guide for tasting of products of intense flavour
- 7999-1976 Tasting of glass for liquid samples
- 8104-1976 Method of test for pungency of chillies by Scoville heat unit
- 8140-1976 Guide for selection of panel for sensory evaluation of foods and beverages
- 8153-1976 Method for sensory evaluation of fruits

INDIAN STANDARDS INSTITUTION

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephone : 27 01 31 (20 lines)

Telegrams : Manaksanstha

Regional Offices:

			Telephone
Western :	Novelty Chambers, Grant Road	BOMBAY 400001	87 97 26
Eastern :	5 Chowringhee Approach	CALCUTTA 700072	23 08 02
Southern :	C.I.T. Campus, Adyar	MADRAS 600020	41 24 42

Branch Offices:

'Pushpak', Nurmohamed Shaikh Marg, Khanpur	AHMADABAD 380001	2 03 91
'F' Block, Unity Bldg, Narasimharaja Square	BANGALORE 560002	2 76 49
Ahimsa Bldg, SCO 82-83, Sector 17C	CHANDIGARH 160017	2 83 20
5-8-56/57 Nampally Station Road	HYDERABAD 500001	4 57 11
117/418 B Sarvodaya Nagar	KANPUR 208005	82 72
B.C.I. Bldg (3rd Floor), Gandhi Maidan East	PATNA 800004	5 36 55
Hantex Bldg (2nd Floor), Rly Station Road	TRIVANDRUM 695001	32 27